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BIOLOGICAL EVALUATION
Mountain Pine Beetle Infestation
Vernal and Flaming Gorge Ranger Districts
Ashley National Forest
1974

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INTRODUCTION

The mountain pine beetle is undergoing a general resurgence throughout many of the pine forests of northern Utah. Widely separated infestation centers now exist in the pine type on the Ashley National Forest, with potentially damaging outbreaks occurring in portions of the Vernal and Flaming Gorge^{1/} Ranger Districts. Serious infestations also persist in portions of the adjacent Wasatch National Forest.

Both the Ashley and Wasatch National Forests have a long history of serious mountain pine beetle activity, with the latest outbreak occurring from 1958 to 1966. During this period large scale suppression programs were undertaken in an attempt to reduce tree killing and retard the spread of the infestation. Although most of these efforts were on the north slope of the Wasatch National Forest, more than 50,000 trees were treated on the Manila Ranger District during the period 1961 to 1964. Since then, however, there has been a resurgence of insect activity throughout the treated areas, with new infestations developing throughout other portions of both Forests.

GENERAL INFORMATION

Insect: Mountain pine beetle, Dendroctonus ponderosae Hopkins.

Host Trees: Lodgepole pine, Pinus contorta Dougl., and ponderosa pine, Pinus ponderosae Laws.

Type of Damage: Killing of lodgepole and ponderosa pine.

Location: Ashley National Forest with emphasis on the Vernal and Flaming Gorge Ranger Districts.

Extent of Outbreak: Throughout the lodgepole and ponderosa pine types, with heaviest damage occurring on the Vernal and Flaming Gorge Ranger Districts. Maps (Figures 1 and 2) of the outbreak areas are appended.

1/ Formerly Manila Ranger District.

BIOLOGICAL INFORMATION

A Forestwide aerial reconnaissance was made in early August and followed by an on-the-ground evaluation survey during the period October 7-11. Evaluation surveys were conducted in a few of the most critical areas; i.e., areas with characteristics that may portend significant shifts in the course of the infestation and where it would be feasible to undertake some form of constructive remedial action.

The general trend of the various infestations was determined, for the most part, by systematic attack-ratio surveys. Trees successfully attacked in 1973 and 1974 were detected along predetermined transects, differentiated as to year of attack, counted, and their diameters recorded. Additional observations were made as to bark beetle brood stage, abundance, and condition; and to the presence and abundance of associated insects, mostly engraver beetles (*Ips* spp.).

Trees previously infested by the mountain pine beetle near Greendale Junction (Figure 3) on the Flaming Gorge District and marked as to year of attack were revisited to observe the nature and rate of crown fading and deterioration. It has long been suspected (see 1970 evaluation report) that in this particular area, the drying period for many of the infested trees is unusually long, and their crowns require more than the normal one-year period to discolor. It was found that the crowns of lodgepole and ponderosa pine trees attacked and killed in 1972 had only recently faded and were easily confused with the normally faded 1973 attacked trees. An attempt was made to use characteristics of tree deterioration, such as bark adherence, checking, and the presence of secondary insects, but these also proved unreliable. It was estimated that this anomaly resulted in at least a 33 percent overestimate of the 1973 attacks (faders). The tree-attack data from this area and Birch Creek, where this phenomenon was also suspected, was then adjusted accordingly.

A summary of biological data for the most important outbreak areas is shown in Table 1 in the appendix. In general, tree killing will continue to increase Forestwide except in those areas of Greendale Junction, Long Park and Ute Mountain--which have sustained infestations for the past several years. However, tree killing will continue in these areas for several years, but at a considerably reduced level.

Vernal Ranger District: Most of the infestations on the Vernal Ranger District are of recent origin and should continue for several years. In the Charleys Park area (Figure 4), the infestation was nurtured in relatively small-diameter lodgepole pine, and biological data portend a decrease in the number of trees killed in the established outbreak areas. In other areas, however, to the north and west of the damaged stands, tree killing will increase with no apparent letup in sight. Although much of the area to the north of the infestation is a mosaic of age and size classes, there is, nonetheless ample host material to sustain and increase the infestation for many years--unless natural control factors intervene.

A significant increase in the number of trees killed in 1974 over those killed in 1973 was recorded near Little and Big Lakes (Table 1). Newly infested trees in this area averaged almost 13 inches d.b.h. and should provide more than sufficient impetus to expand both the intensity and extent of tree mortality in 1975.

Although no ground surveys were made in the extreme northeast corner of the Vernal District, aerial reconnaissance data show a steady and significant increase in the number and distribution of faded trees. Unless unexpected natural forces intervene, it is likely that even more trees will be killed by the mountain pine beetle in 1975.

Throughout most of the Vernal Ranger District, from Charleys Park northeast to the District boundary, tree killing is widespread, ranging from relatively concentrated areas such as Charleys Park to very widely separated individual tree attacks, with the concentration of activity at the lower elevations. If this infestation follows the pattern of past infestations, the single tree attacks will expand to small tree groups, then to larger groups, and eventually merge. Just north of Little Lake, for example, one recently infested group consisted of more than 60 trees.

Flaming Gorge Ranger District: With the exception of the areas west of Hickerson Park, east of Cart Creek, and a few others, most of the infestation should continue to subside. An overview of much of this area is deceptive, for one sees an accumulation of two years' activity rather than one (Figure 4). Widely scattered killing of individual ponderosa pine will continue in the National Recreation Area north of Highway 44, and in groups of lodgepole pine south of the highway to the Divide. Many of these lodgepole stands to the south of the highway are pole-size and should help to lessen the infestation.

A potential outbreak is in the offing on the west edge of the District in the Birch Creek area (Table 1) and around Beaver Meadow Reservoir on the Wasatch National Forest. There are host trees of sufficient number and size in this area to sustain and increase the infestation for several years. There is no biological evidence at this time, to suggest a lessening of activity.

In the Spiers Peak area, killing of both ponderosa and lodgepole pine has increased and will continue to increase during the next two to three years. Many "redtops" will be visible from the Cart Creek overlook.

The longstanding outbreaks surrounding Greendale Junction, Ute Mountain, and Long Park areas will continue to subside due primarily to the lack of sufficient numbers of host trees. Near Greendale Junction, most tree mortality will occur in patches of stagnated, second-growth ponderosa pine. Very light tree losses will continue in and surrounding Bootleg Campground. As previously stated, most of the visible damage is partly an accumulation of two years' activity.

DISCUSSION

Although tree killing will continue at a relatively high level over most of the Forest during the next few years, and probably for the remainder of the decade, the overall level of damage should be considerably less than that experienced elsewhere; i.e., the Targhee and Teton National Forests. In many of the severe infestations losses have run as high as 42 percent of the stand (6-inches d.b.h. and over) and 60 percent of the merchantable volume (8-inches d.b.h. and over). In the Ashley infestations, due to the relatively high elevations, low tree volumes, and the poor growth qualities, overall damage should be considerably less. Most of the losses, however, will be in the larger trees which will impact the long term harvesting program. Stands which incur the heaviest losses will be those at the lower elevations containing a preponderance of large diameter trees. Tree losses will decrease with increases in elevation.

At this time there is no practical control method for epidemic populations of the mountain pine beetle. Individual tree control, ~~whether it be felling and removing the infested trees or spraying them with a toxic chemical~~, may reduce tree killing temporarily, but it will not offset inevitable losses. If a holding action is desired and the value of the threatened trees exceeds control costs, and there is certainty that they can be harvested in time, then some benefit may be gained. Because of the scattered nature of the infestation, its potential for increase, access problems, and relatively low timber values, this appears to be an unlikely course of action. Besides, individual tree control is, for the most part, biologically unsound for it does not change the condition which nurtured the outbreak in the first place--the perpetuation of mature, overmature and decadent lodgepole stands.

Effective long range controls of the mountain pine beetle, considering our past experience and present knowledge, can only be obtained by orderly conversion of the vulnerable stands to a less susceptible state. Efforts are now underway in the Charleys Park outbreak to salvage much of the dead, infested, and immediately threatened timber. This prompt and positive action is encouraged and commended. Plans are also in progress to establish timber sales to the north in the path of the infestation. These efforts will do much to minimize mountain pine beetle impact by utilizing timber that will eventually be destroyed and by slowing the impetus of the infestation by reducing the beetle's food supply.

In the Flaming Gorge District, logging for salvage has been in force for several years and should continue. Particular emphasis should be in those stands west of Hickerson Park where beetle populations are active and on the increase.

In Bootleg campground and other high-use recreation sites where individual tree protection is desired, a high degree of protection can be obtained by the use of the chemical Lindane. In the event this technique is decided on, we will be happy to provide technical assistance.

RECOMMENDATIONS

1. Accelerate logging in threatened and infested stands.
2. Convert vulnerable stands to a less susceptible state by logging in an orderly fashion.
3. Use attack preventive sprays in threatened campgrounds and other high value areas.

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APPENDIX

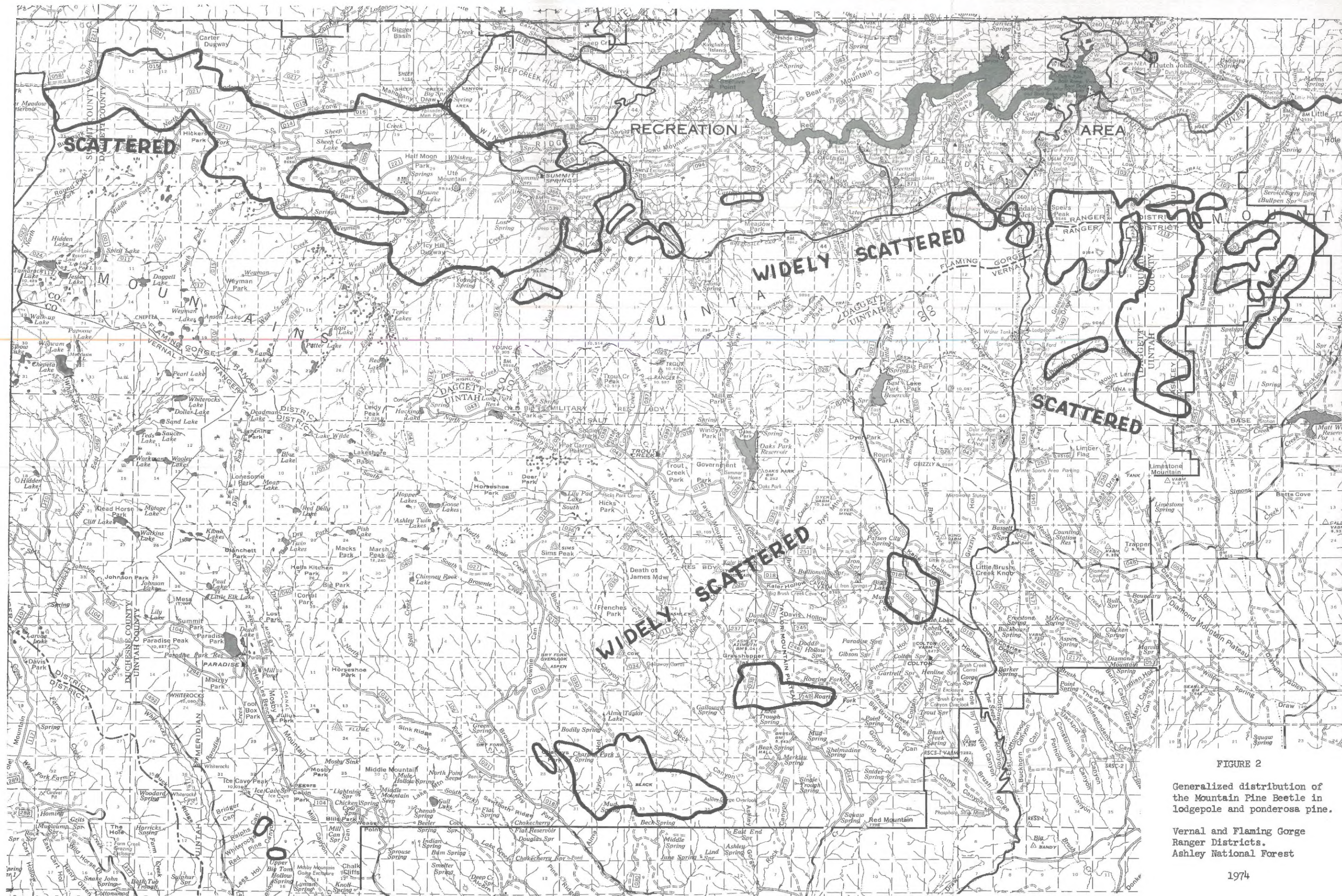


FIGURE 2
Generalized distribution of
the Mountain Pine Beetle in
lodgepole and ponderosa pine.

Vernal and Flaming Gorge
Ranger Districts.
Ashley National Forest



Figure 3. Oblique aerial photograph showing the Greendale Junction infestation, Flaming Gorge Ranger District. Faded trees are a mixture of lodgepole and ponderosa pine and two years' beetle activity.



Figure 4. Infrared and color aerial photographs of the Charleys Park infestation, Vernal Ranger District. On-the-ground evaluation surveys were conducted in the infested area in the lower left. Tree killing will increase in this area in 1975.

Area	Number of Attacks						Combined Attack Ratio	1/ Combined Attack Ratio	Average d.b.h.				Brood Condition	Trend
	Lodgepole		Ponderosa		Combined				1974		1973			
	1974	1973	1974	1973	1974	1973			LP	PP	LP	PP		
Charleys Park #1	52	119	-	-	52	119	0.4:1		9.7	-	9.5	-	Good	Decreasing
Charleys Park #2	59	175	-	-	59	175	0.3:1		8.9	-	9.2	-	Fair	Decreasing
Charleys Park #3	129	90	-	-	129	90	1.4:1		10.8	-	11.8	-	Good	Increasing
Little Lake	121	31	-	-	121	31	3.9:1		12.9	-	12.5	-	Good	Increasing
Greendale	25	21	23	32	48	53	0.9:1		11.1	11.0	11.8	11.1	Fair	Decreasing
Birch Creek	45	38	-	-	45	38	1.2:1		11.1	-	9.9	-	Good	Increasing

1/ Ratio of new (1974) attacks to old (1973).

Table 1. Attack ratios and diameters of mountain pine beetle killed lodgepole and ponderosa pine, Vernal and Flaming Gorge Ranger Districts, Ashley National Forest, 1974